

vertebrate arose from that group of invertebrates which possessed a central nervous system most nearly similar to that of a low vertebrate such as *Ammocoetes*, an invertebrate, therefore, belonging to the group of arthropods. This argument had been worked out by the author in a series of papers published in the *Journal of Anatomy and Physiology*, and receives especial support from the palæontological record. For the dominant race now, the biped mammal man, arose undoubtedly from the highest race evolved up to that time—the quadrupedal mammals; these in their turn originated from the dominant reptiles; these again from the amphibians, which were the most highly organised group of their day. The amphibians themselves came from the dominant race living in the sea at the time—the fishes; so, too, according to the author's theory, the fishes arose directly out of the race previously dominant, i.e. the arthropod group. This theory necessitates the formation of a new alimentary canal at the transition from the arthropod to the vertebrate—a requirement which is no more unlikely than the formation of a new respiratory apparatus at the transition of a fish into an amphibian. The reason why others have found this formation of a new alimentary canal so difficult of acceptance is because embryology—and embryology alone—in its recent teaching makes the alimentary canal, and not the central nervous system, the important organ around which the animal is built up. The author, basing himself especially on Braem's papers in the *Biologisches Centralblatt*, pointed out that in reality the germinal layer theory was a physiological and not a morphological conception, that the one criterion of hypoblast was not its mode of formation but its ultimate fate; whether or no, the definite alimentary canal was formed from it. Morphological laws of development must exist, but to quote Samassa, "one thing can be said with certainty at the present time, the germinal layer theory is not one of them." The author suggested a re-consideration of the whole matter, and, starting with the adult, pointed out that the tissues of the body fall naturally into two great groups, those which are connected with the central nervous system, the master tissues of the body, and those which live a free existence without any such connection. The body might be looked upon as composed of a neuro-epithelial syncytium, in the meshes of which free cells live.

Prof. Cleland, F.R.S., in conclusion, read a communication on the growing-point of the Vertebrata, in the course of which he pointed out that while the medullary folds appear in close connection with the blastopore, and the parts concerned with the cranium and its contents are the first to appear, both mesoblastic somites and spinal nerves appear in succession, each metamere behind that which is immediately proserial to it. It follows, therefore, that it is from the short space between the medullary folds and blastopore that new metameres of the neuromuscular system are formed, and there is no reason to doubt, the author held, that the visceral system is extended in the same manner. The nucleated corpuscles of this region furnished, therefore, in his opinion, the parents of the corpuscles of which the successive metameres of the trunk are composed, and they do so by giving off successive series of corpuscles which belong each to a particular metamere.

#### EDUCATIONAL SCIENCE AT THE BRITISH ASSOCIATION.

THE most noteworthy feature in the educational science section at the South African meeting of the British Association was the address of its president, Sir Richard Jebb, an address which was originally delivered at Cape Town, and repeated with a little variation at Johannesburg. The address, which was printed in full in *NATURE* of September 28 (p. 545), dealt with the idea of a university and the distinction which marks off the teaching of a university from that of a higher technical school or similar institution.

The subject of the address was the more apposite in that the most pressing educational question in South Africa at the present time is the creation of a teaching university. The present Cape University is an examining

body only, and it has been suggested that the time has come for it to grow into a teaching university by the combination of the colleges at present preparing for its examinations, much as the University of London was so recently re-created. The difficulties, however, both of funds and of conflicting interests have not yet been overcome.

At Johannesburg, also, the successful start of the recently established technical institute has led to a plan for its growth into a university, with engineering, agriculture, law and education as its main faculties, and it seems not unlikely that liberal financial support would be forthcoming should it be decided on fuller consideration to adopt such a scheme.

At the sectional meetings a large proportion of the papers was contributed by teachers resident in South Africa, so that opportunities were afforded to the visitors of learning what were the more pressing educational problems, and to the local members of discussing these problems on a wider platform. At Cape Town the Rev. W. E. C. Clarke gave a general review of the development of education in the colony, laying particular stress on the perennial difficulty of providing any efficient scheme for the instruction of the widely scattered country population. Mr. Clarke's paper excited considerable interest, and led to renewed discussion, especially the latter portion, which dealt with the status of the teacher in Cape Colony. He spoke of the power of the Cape Teachers' Union, and deplored the tendency of their conferences to be rather exclusively occupied with questions of salary and allowances instead of leading public opinion on matters of educational policy.

Mr. W. W. Way, principal of the Graaf Reinet College, also contributed a brilliantly written and hard-hitting paper on the disabilities of the South African schoolboy. He pointed out how the semi-tropical climate, the wealth of sun and air, the freedom and isolation of the life of the South African boy, while they produce an alert and self-reliant race, do not work well in the interests of education. The youth are essentially undisciplined and unintellectual, while the early physical development brings its own dangers. Mr. Way touched upon the further difficulties, both as to mind and morals, which arise out of the proximity of the native, the co-existence of two languages, the inferior type of teacher that characterised the past, and the narrowing influence of many of the religious bodies in the country. Nothing but an ampler endowment and a general rise in the status of the teacher can induce in the future South African a proper respect for his intellectual development.

The general history and administration of education in the other colonies were thoroughly dealt with at the Johannesburg meeting in a series of papers contributed by Mr. Warre Cornish, Mr. Gunn, and Mr. Duthie. They all showed certain common problems—the scarcity of suitable teachers and the necessity of improving their status and training, the expense of providing adequate school buildings, and the difficulties induced by the isolation of the farms. This latter question of education upon the Veld was also dealt with in a breezy paper by Mr. J. H. Corbett, a vivid and sympathetic presentation of the case, in which the author evidently trusted more to the self-devotion of the individual teacher than to any possibilities of organisation.

The second meeting at Cape Town opened with a paper by Mr. W. M. Heller on the methods of teaching science, with an introduction by Prof. H. E. Armstrong. At its close Mr. Oscar Browning expressed his dissent from the current view of the "heuristic" method—as an instrument of education it was valueless, and all good teachers of history and literature had worked by this method long before Prof. Armstrong resuscitated its unhappy name. Mr. A. D. Hall claimed that the value of the "heuristic" method lay in the inspiring ideal it set up; unrealistic as it might be, the natural tendency of the teacher was to drift along the other easier way of giving instruction *ex cathedra* instead of by the path of discovery and experiment. Mr. G. Fletcher, however, rather hit off the feeling of the meeting when he suggested that a close time should be declared for discussions of the "heuristic" method, which had in past years occupied far too much of the

attention of the educational section. Mr. Fletcher's own paper, which followed, dealt with the development of technical education in a new country, and suggested that many of the methods which had been successful in Ireland in the way of creating public interest and of eliciting the cooperation of the locality might well be adopted in South Africa. Nor should the Administration be deterred from making a start with technical education at any centre by reports as to the apathy of the residents; Irish experience would seem to show that a supply of good instruction would always produce an increasing demand for it.

The very important question of agricultural education was treated at Johannesburg by Mr. F. B. Smith, the Director of Agriculture in the Transvaal, and by Mr. A. D. Hall at Cape Town. Mr. Smith showed how efficiently an intelligence department had already been organised in the matter of agriculture in the Transvaal, where the farmer had at his call a service for investigation and advice which could not be rivalled in any other British country. An enormous amount of work had now been done on such matters as the introduction of improved crops, the eradication of stock diseases, &c., and the Afrikaner farmer was beginning to rely upon the help of the department. Mr. Smith further outlined the nature of the course it was proposed eventually to establish in the Transvaal in connection with the future university. Mr. Hall was disposed to think that questions of economy would necessitate the colonies concentrating their efforts chiefly upon their expert staff for investigation and work among the current generation of farmers, and that there was not the same call for another staff to give instruction in the higher branches of agricultural science. The type of instruction for which the most pressing demand existed was a practical training in more improved methods of farming, and this could well be developed in connection with the experimental farms that had already been instituted in various parts of the country. It seemed as yet hardly worth while to create an elaborate teaching institution to produce the small number of experts and Government officers whom the country would require yearly, since suitable men could be picked out during the earlier practical courses of instruction and sent home to complete their scientific training.

One question, which recurred constantly during the tour, both in section meetings and in conversation, was that of native education, a thorny subject interwoven with many prejudices, both racial and religious. The general feeling among colonials is almost wholly opposed to education of what may not unfairly be called the ordinary missionary type, which seeks to teach the native to read and write English. Many large employers of labour refuse to engage any native acquainted with English, and other experienced men declare that the only effect of such a bookish training as has been given in the past is to make the native parasitic, either upon the white community or his more primitive fellows. But education by means of handicrafts, and proceeding entirely in the natives' own language, meets with general approval, both as supplying a much desiderated discipline and making the native more efficient economically, and also as likely to prove a sound method of eventually leading the native on to a higher plane of civilisation. This is essentially a matter on which the visitor can only speak with diffidence; indeed, it is claimed that many of the difficulties have arisen from the ill-considered, though well meaning, action of people at home.

The papers of more general interest included a discourse by Dr. J. H. Murray on "the world of words," in which he discussed, with appropriate illustrations from the English language, the various types of words and the manner in which they originated. Dr. Brill, rector of the Grey College at Bloemfontein, again submitted a paper of great interest on the origin of the "Tael," the form of Dutch commonly spoken throughout South Africa. The Tael he holds to be a pure Dutch, "clipped," however, by the removal of practically all inflexions, genders, and

irregular forms. What little foreign element exists in the language he attributes to early intercourse with the East, and regards it in the main as of Malayo-Portuguese origin. The members of the British Association who were interested in education had many opportunities of seeing the schools in the centres they visited, and also of intercourse with the teachers at work in them. The raw material with which the latter have to deal may not as yet have imbibed any great keenness for learning, but the general attitude of the citizens of the country towards education, as indicated, for example, in such matters as school buildings (often in the smaller towns of Cape Colony the most notable public building was the school), shows a life and determination which will not be long before bearing fruit.

### THE SCOTTISH NATIONAL ANTARCTIC EXPEDITION.

A SUMMARY of some of the preliminary scientific results of the Scottish National Antarctic Expedition appeared in the August number of the *Scottish Geographical Magazine*, and this has now been issued in the form of a corrected reprint, from the office of the expedition in Edinburgh. The pamphlet contains an introduction by Mr. W. S. Bruce, the leader of the expedition, a paper

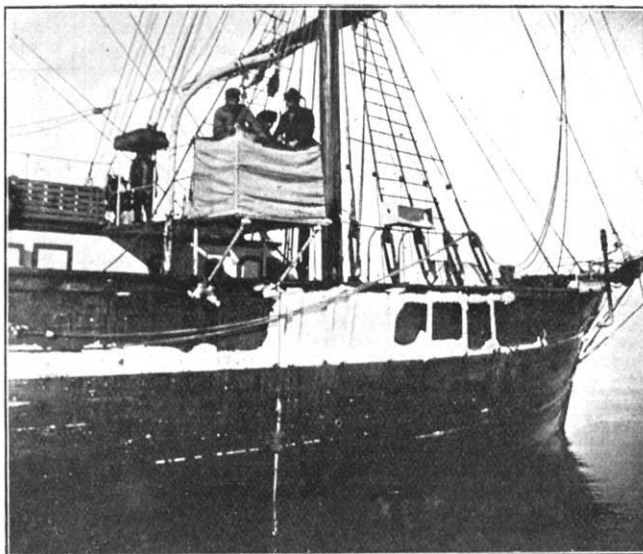


FIG. 1.—*Scotia* sounding in supposed Ross Deep  $68^{\circ} 32' S.$ ,  $12^{\circ} 49' W.$ , on March 23, 1904.

on the bathymetrical survey of the South Atlantic Ocean and Weddell Sea, also by Mr. Bruce, and short papers on the deep-sea deposits, by Dr. Harvey Pirie, on the meteorology of the expedition, by Mr. Mossman, and on Diego Alvarez, or Gough Island, by Mr. Rudmose Brown. An account of part of the work of the expedition has already appeared in these columns (*NATURE*, March 2).

The most important facts brought to light in the course of the sounding and exploring work are those connected with the discovery of Coats Land, and the final removal from the map of the "Ross deep," in which the *Erebus* and *Terror* reported 4000 fathoms no bottom. The supposed coast-line of the Antarctic continent south-east of the Weddell Sea has hitherto been placed in about  $80^{\circ} S.$  lat., probably because of the belief, to which certain temperature observations seemed to give support, that Ross's sounding was really correct. The *Scotia* discovered Coats Land in  $72^{\circ} 25' S.$ ,  $17^{\circ} 27' W.$ , and skirted the coast for 150 miles. Within 2 miles of the assigned position of Ross's sounding ( $68^{\circ} 32' S.$ ,  $12^{\circ} 49' W.$ ) the *Scotia* touched bottom in 2660 fathoms, and the sounder brought up a large sample of blue mud. "Thus," as Mr.